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SOME RECENT ECONOMIC AND SCIENTIFIC QUESTIONS IN ORNITHOLOGY.*

BY R. W. SHUFELDT, M. D., WASHINGTON, D. C.

ORNITHOLOGY has attained to a status to-day never before reached by that science at any time within the recollection of man, or as shown by its literature.

In this country its cultivation not only interests thousands of amateurs, but its pursuit is followed by a host of eager experts, while its economic value has not altogether been overlooked by the government, which annually makes an appropriation in support of a department dealing with ornithological questions as related to agriculture. Regarded as the science is, then, from so many varied standpoints, it is not at all surprising that we find the collecting of birds actively undertaken for a great variety of purposes. Some of these are perfectly justifiable and fall strictly within the demands of the science and are essential to its progress, while others lie more or less without the pale of any such need, and consequently are deserving of our most energetic condemnation or prosecution. Thousands of birds are destroyed every year as a mere matter of sport, and either no use made of them whatever, or none worthy of mention. In this category. of course, I do not include the killing of game-birds for the table, a privilege that can be properly restricted legally, although it is very frequently more than abused. Many native birds are annually trapped for cages, and a large proportion of them perish. Quantities are destroyed by "feather-hunters" to supply the demands of fashion. Numbers are killed by ignorant farm-hands, who labor under the impression that they do humanity a direct benefit every time they take the life of a king-bird, a martin, or a marsh-hawk.

Then there are a few taxidermists who habitually destroy birds as a business, to preserve their skins and mount them for sale. As a rule, however, taxidermists are engaged only in the preservation of such birds as are brought to them, or else pursue their profession in scientific educational institutions or elsewhere.

Next we meet with every grade of amateur and scientific collector of bird-skins, who claim each year a certain proportion of specimens for scientific or semi-scientific purposes. In nature, also, some species prey upon others and thousands are thus annually destroyed, while every season the lives of millions of others are claimed by storms, high winds and downpours of heavy rain. Certain predatory mammals capture others, or reptiles devour their young. No doubt, finally, that diseases, injuries and accidents take away their annual quota, but the proportion thus destroyed must, in comparison with other causes of mortality, be exceedingly small.

Now for a number of years past it has been widely noticed that in the suburban districts of many cities all over the United States, there has been a more or less marked decrease in numbers of many of our native birds, as, for example, orioles, robins, blue-birds and many other species. Frequently such reports are only too well founded in fact, while in other cases they have been over-rated. Certain it is, nevertheless, that within the last twenty years birds in the most of such localities have been becoming more and more scarce, while in some places where certain species were formerly abundant, those very species are practically now almost extinct. Numerous inquiries, scientific and otherwise, have been made with the view of finding out, if possible, the cause or causes which are accountable for bringing about this very undesirable state of things. After more or less mature deliberation some attributed it to one cause, some to another, and some to a combination of causes. Many were disposed to believe that the introduction of the English sparrow lay at the bottom of the whole trouble; in the eyes of some the "feather-venders" had all to do with it, while from other quarters the blame was attached entirely to the taxidermists and the bird collectors. As far as the writer has seen or heard not much importance has ever been attached to any other cause as a means of destruction of bird life, with perhaps the exception of the introduction of large lighting apparatuses in many places, where no doubt thousands of birds at night are yearly destroyed.

For more reasons than one the introduction of the English sparrow into this country was an expensive blunder, but that they are chiefly responsible for the disappearance of many of our native species of birds in the localities we have mentioned, I never have in that view been a firm believer, and my faith is not increased as time goes by. In the first place, it directly militates against every personal observation I have ever made in the premises, and I have faithfully studied the species for many years. Many of our native birds whip the English sparrow in each and all contests where they come in contact, and drive them out of the nesting places. They almost invariably give way before robins, cat-birds, wrens, martins and many others. Blue-birds appear to be more timid and gentle, and they simply keep out of the sparrow's way and make no attempt to oppose him, while on three or four occasions last spring I have seen the common house wren deliberately hustle sparrows out of a bird-box, where they had bred the season before, and reoccupy it themselves.

That the indiscriminate slaughter of small birds for millinery purposes, by conscience-ridden dealers, was for a long time a prime cause has been proven beyond cavil, and such people should simply be prosecuted by all the rigor of the law, and made to desist quite as promptly as that party who would commit any act that threatened the agricultural interests of the country, for no one will question for a moment but what the removal of our insectivorous birds does that very thing. Were all the birds in the country destroyed there is no power known to man that could check the enormous increase in insect life or the destruction of plant-life that would follow as a consequence. Such a wholesale disturbance of Nature's balance will not occur; while on the other hand I am not prepared to say whether the recent known decrease in our birds in certain localities has been followed by a cor-

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responding increase of any particular species of noxious insects. That is a point for the entomologist to decide for us.

What comparatively few birds are gathered in for scientific purposes, I am strongly of the opinion, has but very little influence either one way or the other upon bird increase or decrease. Take a city like Chicago, for example, and its extreme suburban environs; how few, indeed, in proportion to her population, are there of her inhabitants who collect in the neighborhood birds for scientific purposes! In the course of a collecting season how many young scientific ornithologists in Chicago go out into her suburbs to collect birds? Not in any sufficient numbers, I warrant, to have any material effect upon the decrease of native birds. The same suggestion is applicable to other large towns and cities in the United States and Territories. When one comes to think of the millions of birds that pass over the country during the vernal or autumnal migrations *every year*, and then come to compare that host with all that has been deducted from it during the last century, as represented by all the birds actually existing in scientific collections, the loss is hardly worthy of mention. Moreover, more than half of our scientific avian collectors do not collect in the suburban districts but go far from the habitations of men, and so their work cannot be said to affect the question at all.

But there is a cause in my opinion, however, for the scarcity of our native birds in and about cities and large towns of this country, before which all other reasons we have mentioned stand absolutely aghast. It is the wholesale destruction carried on by the army of unscrupulous small boys in any particular place. I am the more convinced of this from my observations in and about Washington, D. C., during the past four years. This active destruction has been made possible by the numerous comparatively recent and cheap inventions in the way of air and spring-guns, as well as cheap rifles of small calibre, also other fatal contrivances that will noiselessly throw missiles of a variety of kinds with great accuracy. Hundreds of those guns are sold annually to boys, and the latter never seem to tire of strolling about orchards and hedge-rows and knocking over dozens upon dozens of birds with them. One day last spring I met one such youngster, and upon examining his game-bag found it absolutely crammed full of dead birds which he had killed since starting out in the morning. One item alone consisted of seventy-two ruby and golden-crowned kinglets. The same fellow boasted of having slain over one hundred cat-birds that season. Boys get to be wonderfully expert shots with the kind of guns to which I refer, and as the ammunition costs little or nothing, and a great quantity can be carried at a time, it is easy to be seen that between the wholesale slaughter they can and do commit, in addition to keeping the remaining birds perpetually alarmed, it is no wonder that they are soon driven away from the neighborhood of our cities and country seats.

There are ample legal measures within our power to enforce, to prevent this cause of bird decrease, especially if the fathers of those boys are held responsible, and I would suggest that it be the sense of this congress that such measures will be recommended to the various State legislators hereafter that will have the tendency to thoroughly discourage such practices.

A NEW THERMOELECTRIC PHENOMENON.

BY W. HUEY STEELE, M. A., MELBOURNE UNIVERSITY.

It is stated in many text-books, and pretty generally known, that electric currents may be produced by heating a single metal, if there be any variation in temper, or if the distribution of heat be very irregular and the changes of temperature abrupt. These effects are generally supposed to be exceedingly small compared with ordinary thermoelectric effects, but some experiments performed by the writer in the Physical Laboratory of the University of Melbourne show that at high temperatures these effects are sometimes exceedingly large, as great or greater than that given by a junction of antimony and bismuth at the same temperature. At low temperatures this is most apparent in iron wires, iron being the only metal in which I could observe the effect at a temperature below 100°C. If a piece of iron wire be put in circuit with a very sensitive galvanometer and gently heated irregular currents will flow, sometimes one way, sometimes the other, rising and falling in an apparently arbitrary manner. I several times observed the effect simply by warming the wire with my fingers. At a red heat the effect is much more marked and also much more irregular. The effect in iron, however, is not so great as in some other metals at a high temperature, the highest effect I observed in it being .002 volt. Altogether twelve different metals and four alloys were examined and the effect noticed in each of them. In order to raise them to a high temperature without breaking circuit by their fusing I put them through clay tubes (tobacco pipe stems), and when examining metals with low melting points I completely filled up the tube with the metal. A tube of lead when heated gave, after a little irregular heating, .3 volt, and another, with a lead wire passed through it and heated about the middle, gave about half that amount, but in this case there was no irregular or unsymmetrical heating. The effects are not always steady, in fact they very seldom keep steady, but they may be observed with certainty by filling a tube with lead and raising it to a red heat in a Bunsen flame. The effect may also be observed very easily in fine gold wire, but it does not last so long as that in lead, which shows no sign of ceasing after an hour's or half a day's heating. With gold I observed a higher effect than with any other metal, once observing nearly half a volt. .3 volt was observed with six different metals—lead, copper, gold, tin, zinc and antimony, while, with others, *e. g.*, silver and aluminum, though I could certainly observe the effect, it was exceedingly small. Sometimes when a metal is heated thus the changes in the electromotive force generated are slow and gradual and at times scarcely perceptible, while at others they are rapid and sometimes apparently instantaneous at a time when the temperature is perfectly steady and nothing is apparent which could cause the changes. Another curious effect is that sometimes when the temperature is falling, after the gas has been turned down or put out, there are rises, generally sudden, in the e. m. f., this was chiefly noticed in lead. These phenomena are generally quite sufficient to mask the ordinary thermoelectric effect at a red heat. and thermoelectric tables are consequently quite unreliable for high temperatures.

CURRENT NOTES ON ANTHROPOLOGY.—NO. XXXIV.

(*Edited by D. G. Brinton, M. D., LL.D., D.Sc.*)

BASTIAN ON BUDDHISM AND THE PLACE OF DEPARTED SOULS.

Religions, like all other expressions of human intelligence, will ultimately come under a rigid scientific examination at the hands of anthropologists, and the laws of their growth and change will be determined without respect to the clamors of their votaries. Of all religions, that which certainly occupies the most territory in the Old World and perhaps has the greatest number of believers is Buddhism. It has recently attracted the attention of several of the ethnologists of Europe, among them